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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/571,293

03/09/2006

Yasuharu Negi

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OLIFF & BERRIDGE, PLC

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EXAMINER

QUARTERMAN, KEVIN J

ART UNIT

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2889

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/571,293	Applicant(s) NEGI ET AL.	
	Examiner Kevin Quarterman	Art Unit 2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 1,4-6,8 and 10-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>0306</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
2. The following title is suggested: --ELECTRON TUBE ELECTRON-BOMBARDED SEMICONDUCTOR DEVICE--.

Claim Objections

3. Claims 1, 4-6, 8, and 10-12 are objected to because of the following informalities: Claim 1 recites "a outer periphery" in the 5th line of the claim. It appears that "a" should be replaced with the term "an" instead, since it is followed by the term "outer" in the claim. Appropriate correction is required.
4. Claim 4 recites "the tube" in lines 3, 4, and 6 of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.
5. Claim 5 recites "the tube" in lines 2-4 and 6 of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.
6. Claim 6 recites "the tube" in lines 2-4 and 6-7 of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.

7. Claim 8 recites "the tube" in the last line of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.
8. Claim 10 recites "the tube" in lines 4-5 of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.
9. Claim 11 recites "the tube" in lines 3 and 5-6 of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.
10. Claim 12 recites "the tube" in lines 2-4 and 6-7 of the claim. The term "insulating" should precede the term "tube" in the claim for consistency in claim terminology, and also so there is no confusion of which *tube* is being referred to in the claim.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Helvy (US 4,855,642) in view of Suyama (US 5,874,728).

14. Regarding independent claim 1, the sole figure of Helvy shows an electron tube comprising an envelope (12) formed with a photocathode (16) at a predetermined part of the internal surface thereof; a fixing plate (24) which is disposed in the envelope and which has a central position and an outer periphery surrounding the central position; a first tubular wall (46) which is fixed to a position between the central position and the outer periphery of the fixing plate, the first tubular wall extending toward the photocathode; and an evaporation source (42) generating metal vapor, the evaporation source being disposed inside the envelope on the photocathode side relative to the fixing plate and being disposed at a position between the first tubular wall and an imaginary-extended-curved-surface of the outer periphery of the fixing plate that extends toward the photocathode.

15. Helvy teaches the limitations of independent claim 1 discussed earlier but fails to exemplify an electron-bombarded semiconductor device fixed to a central portion of the fixing plate.

16. Suyama teaches, in Figure 3, that it is known in the art to provide an electron tube with an electron-bombarded semiconductor (40) being fixed to a central portion of

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a fixing plate (31). Suyama discloses that the semiconductor is used for performing detection with a high S/N ratio (col. 6, ln. 34-50).

17. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the electron tube of Helvy with the electron-bombarded semiconductor device taught by Suyama for detecting photoelectrons emitted from the photocathode in response to an incident light thereon.

18. Regarding claim 2, the sole figure of Helvy shows an insulating tube (39) having one end and another end, the another end being connected to the envelope and the one end protruding inside the envelope, wherein the fixing plate and the evaporation source are disposed on the one end of the insulating tube.

19. Regarding claim 3, the sole figure of Helvy shows the envelope including a cylindrical base and a main body having a first main body that is curved substantially in a spherical shape and a second main body that is curved substantially in a spherical shape and that connects the first main body to the base.

20. Helvy fails to exemplify the semiconductor device being disposed on the main body side relative to an intersection between an axis of the base and an imaginary extended surface of the second main body that is located inside the base.

21. Suyama teaches, in Figure 3, that it is known in the art to provide an electron tube with an electron-bombarded semiconductor (40) being fixed to a central portion of a fixing plate (31). Suyama discloses that the semiconductor is used for performing detection with a high S/N ratio (col. 6, ln. 34-50).

22. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the electron tube of Helvy with the semiconductor device taught by Suyama being disposed the main body side relative to an intersection between an axis of the base and an imaginary extended surface of the second main body that is located inside the base for detecting photoelectrons emitted from the photocathode in response to an incident light thereon.

23. Regarding claim 4, the sole figure of Helvy shows the another end of the insulating tube connected to the envelope and the one end of the insulating tube protruding inside the main body of the envelope, and wherein the fixing plate and the evaporation source are disposed on the one end of the insulating tube.

24. Regarding claim 5, the sole figure of Helvy shows a conductive member (38) provided on the one end of the insulating tube and protruding outside the insulating tube, wherein the fixing plate includes an inner stem that is connected to the one end of the insulating tube via a conductive member.

25. Regarding claim 6, the sole figure of Helvy shows conductive member (50) provided on the another end of the insulating tube and protruding outside the tube, wherein the envelope includes an outer stem connected to the another end of the insulating tube, at least a part of the outer stem that is connected to the another end of the insulating tube being conductive.

26. Regarding independent claim 7, the sole figure of Helvy shows an electron tube comprising an envelope (12) formed with a photocathode (16) at a predetermined part of the internal surface thereof; a first tubular wall (46); an evaporation source (42) that

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generates metal vapor, the evaporation source being disposed within the envelope and outside the first tubular wall; and a second tubular wall which surrounds the evaporation source.

27. Helvy teaches the limitations of independent claim 1 discussed earlier but fails to exemplify an electron-bombarded semiconductor device provided inside the envelope.

28. Suyama teaches, in Figure 3, that it is known in the art to provide an electron tube with an electron-bombarded semiconductor (40) provided inside the envelope.

Suyama discloses that the semiconductor is used for performing detection with a high S/N ratio (col. 6, ln. 34-50).

29. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the electron tube of Helvy with the electron-bombarded semiconductor device taught by Suyama for detecting photoelectrons emitted from the photocathode in response to an incident light thereon.

30. Regarding claim 8, the sole figure of Helvy shows an insulating tube (39) having one end and another end, the another end being connected to the envelope and the one end protruding inside the envelope, wherein the first tubular wall and the evaporation source are disposed on the one end of the insulating tube.

31. Regarding claim 9, the sole figure of Helvy shows the envelope including a cylindrical base and a main body having a first main body that is curved substantially in a spherical shape and a second main body that is curved substantially in a spherical shape and that connects the first main body to the base.

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32. Helvy fails to exemplify the semiconductor device being disposed on the main body side relative to an intersection between an axis of the base and an imaginary extended surface of the second main body that is located inside the base.

33. Suyama teaches, in Figure 3, that it is known in the art to provide an electron tube with an electron-bombarded semiconductor (40) being fixed to a central portion of a fixing plate (31). Suyama discloses that the semiconductor is used for performing detection with a high S/N ratio (col. 6, ln. 34-50).

34. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the electron tube of Helvy with the semiconductor device taught by Suyama being disposed the main body side relative to an intersection between an axis of the base and an imaginary extended surface of the second main body that is located inside the base for detecting photoelectrons emitted from the photocathode in response to an incident light thereon.

35. Regarding claim 10, the sole figure of Helvy shows the another end of the insulating tube connected to the envelope and the one end of the insulating tube protruding inside the main body of the envelope.

36. Regarding claim 11, the sole figure of Helvy shows an inner stem connected to the one end of the insulating tube via a conductive member (38); and a conductive member provided on the one end of the insulating tube and protruding outside the insulating tube.

37. Regarding claim 12, the sole figure of Helvy shows conductive member (50) provided on the another end of the insulating tube and protruding outside the tube,

wherein the envelope includes an outer stem connected to the another end of the insulating tube, at least a part of the outer step that is connected to the another end of the insulating tube being conductive.

38. Regarding claim 13, Helvy teaches the limitations of independent claim 1 discussed earlier but fails to exemplify the envelope being applied with a ground potential and wherein the semiconductor is applied with a positive potential.

39. Suyama teaches, in Figure 1, that it is known in the art to provide an electron tube with a ground potential being applied to the envelope and a positive potential being applied to the semiconductor. Suyama discloses that this arrangement is provided for obtaining an avalanche multiplication gain of about 50 (col. 6, ln. 17-33).

40. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the electron tube of Helvy with the potentials taught by Suyama for improving the efficiency of the device.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quarterman whose telephone number is (571)272-2461. The examiner can normally be reached on M-TH (7-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on (571) 272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin Quarterman
Primary Examiner
Art Unit 2889

/Kevin Quarterman/
Primary Examiner, Art Unit 2889
15 April 2008